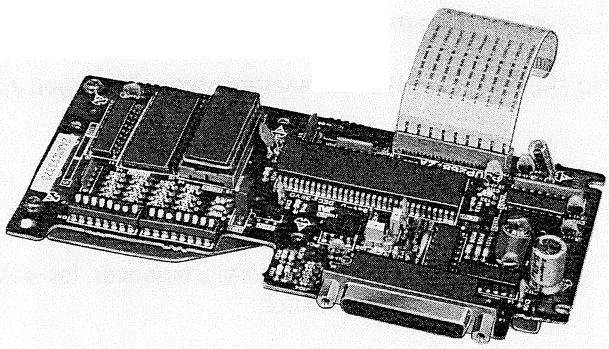
ORDER NO. KM69204430C0
G5

# Service Manual

RS232C Adapter

# KX-PS13

SD



## ■SPECIFICATIONS

| | |
|---|---|
| Baud Rate: | 75, 110, 134, 5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200 |
| Parity Check: | Even, Odd |
| Data Bit: | 7, 8 |
| Protocol: | XON/XOFF,DTR. EX/ACK |
| Dimensions: | 6.7(W) x 3.4(D) x 0.94(H) in. [171(W) x 87(D) x 24(H) mm.] |
| Weight: | Approx.180 g |

Specifications are subject to change without notice.

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Panasonic

**Panasonic Communications & Systems Company**
**Division of Matsushita Electric Corporation of America**
Two Panasonic Way
Secaucus, N.J. 07094

**Matsushita Electric of Canada Limited**
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

**Matsushita Electric Industrial Co., Ltd.**
Central P.O. Box 288,
Osaka 530-91, Japan

**Panasonic Sales Company, Division of Matsushita Electric of Puerto Rico, Inc.**
San Gabriel Industrial Park
65th Infantry Ave. Km.9.5
Carolina, Puerto Rico 00630

# 1. Introduction

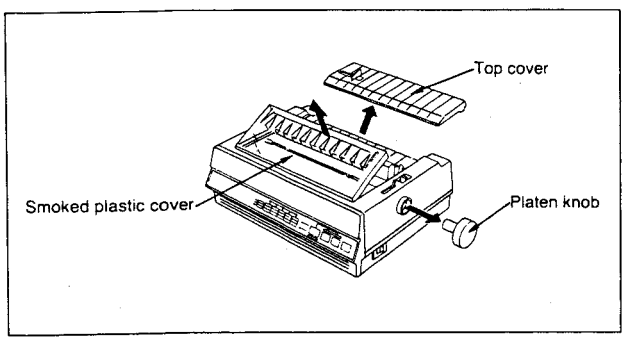
The KX-PS13 interface is equipped with an RS-232C adapter and Current Loop interface. It is designed for asynchronous data transfer with speeds of 75 ~19200 baud. By adjusting the two 8-set DIP switches on the serial board, the baud rate, parity check, data word length, DTR polarity, buffer size, buffer type, DTR, XON/XOFF and ETX/ACK protocol, and self test can be set. This optional interface can be set for current loop (20mA) by relocating jumpers on the board.

# 2. Installation

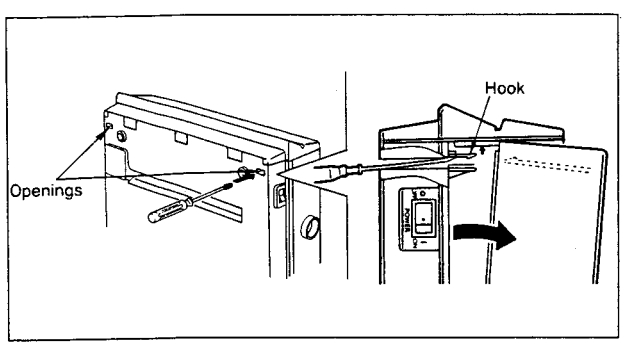
Before connecting the interface board, ensure the power cord is disconnected to prevent electrical shock.

To install the serial interface board (KX-PS13), refer to (A), (B), (C), (D) or (E) method depending upon your printer.

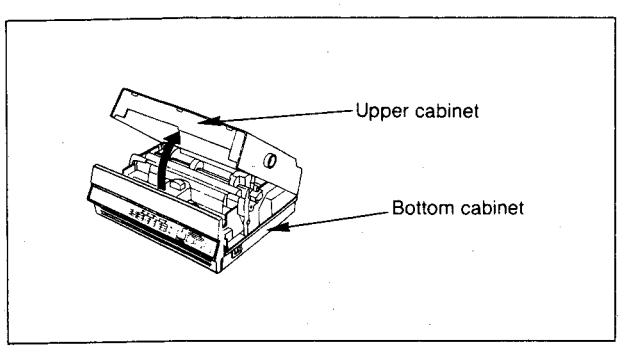
**(A) KX-P1123/KX-P1180/KX-P1191/KX-P1180i**
**Note:** The illustration you see are drawn from KX-P1180.



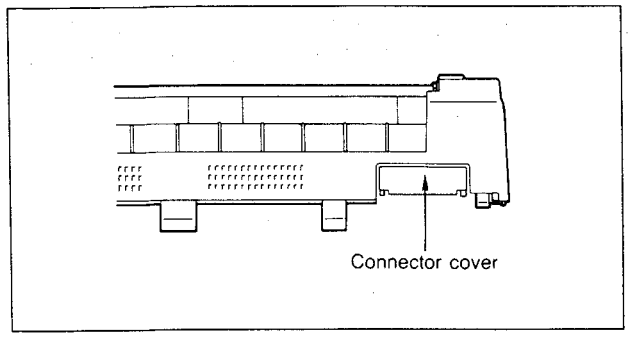

(1) Remove the smoked plastic cover, top cover and the platen knob.



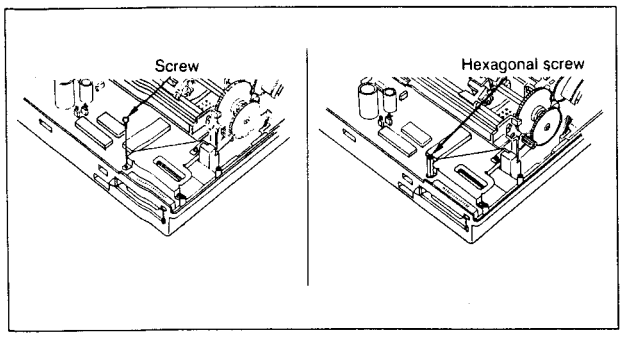

(2) To remove the upper cabinet, raise the unit and insert a screwdriver [Philip 1/4" (6 mm)] straight in the center of the openings. Push the screwdriver to release the hooks.



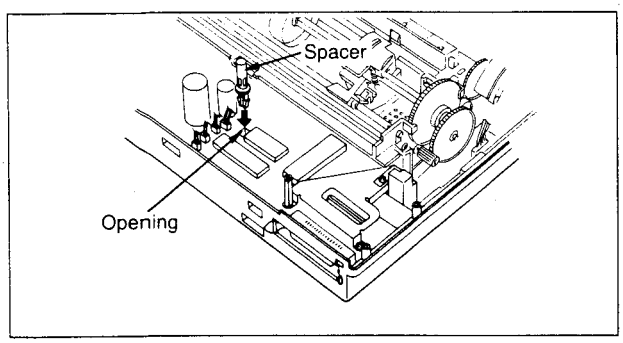

(3) Carefully raise and remove the upper cabinet from the bottom cabinet.



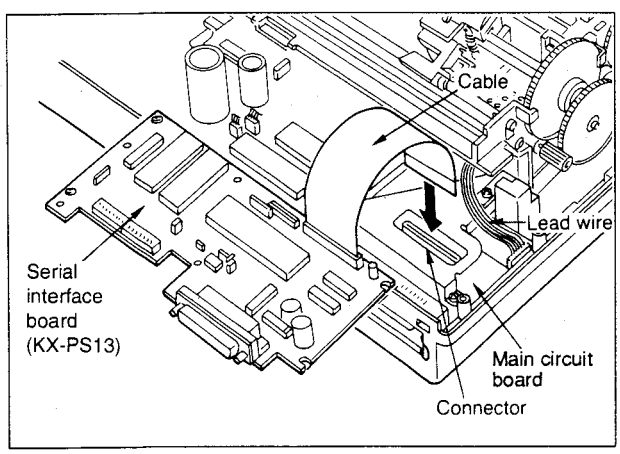

(4) Remove the connector cover from the rear of the upper cabinet.




(5) Remover the screw from the bottom paper, and the install the hexagonal screw.

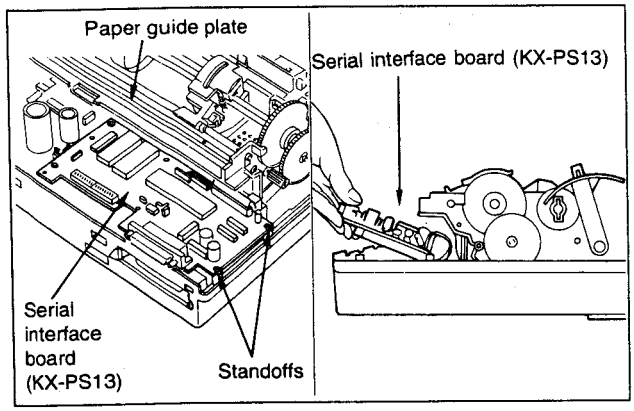



(6) Install the spacer in the opening of the control circuit board.

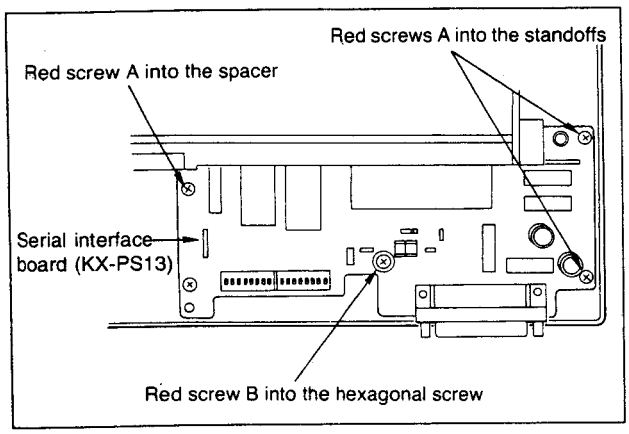



(7) Connect the cable of the serial interface board (KX-PS13) to the connector on the main circuit board inside the printer.

**Note:** Push the lead wire to the left side under the paper guide plate.




(8) Carefully position the serial interface board (KX-PS13) on the spacer, the hexagonal screw and the two standoffs as depicted in the diagram below.


Red screws A into the standoffs
Red screw A into the spacer
Serial interface board (KX-PS13)
Red screw B into the hexagonal screw

(9) Secure the serial interface board (KX-PS13) with the three red screws A and one red screw B.

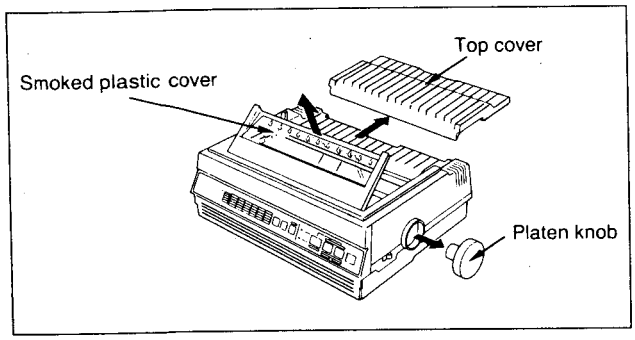
(10) Make sure that the DIP switch settings you select match your compute's serial parameters (refer to Section 5).

(11) Replace the upper cabinet, smoked plastic cover, top cover and the platen knob.

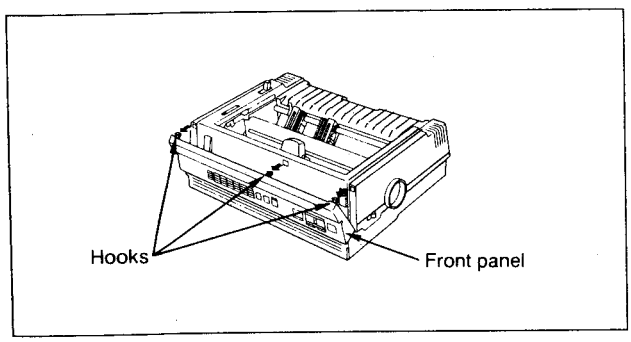
**Note:**
After installation, the following parts will be of no use.
Red screw B ..... 1
Hexagonal screw ..... 1

**(B) KX-P1124/KX-P1124i**

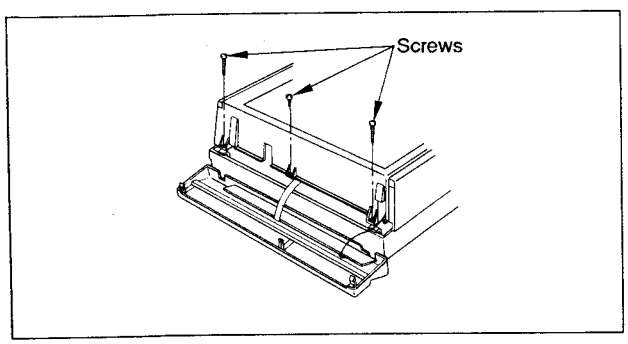
**Note:** The illustrations you see are drawn from KX-P1124.



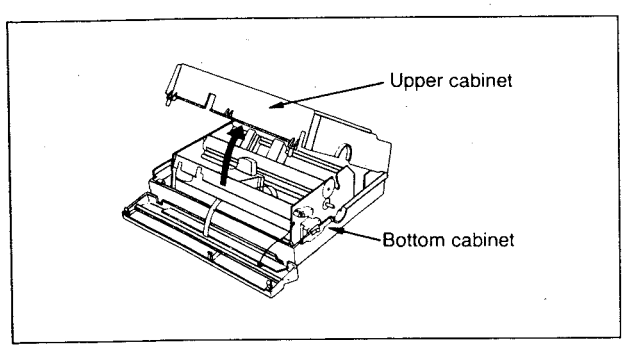

(1) Remove the smoked plastic cover, top cover and the platen knob.



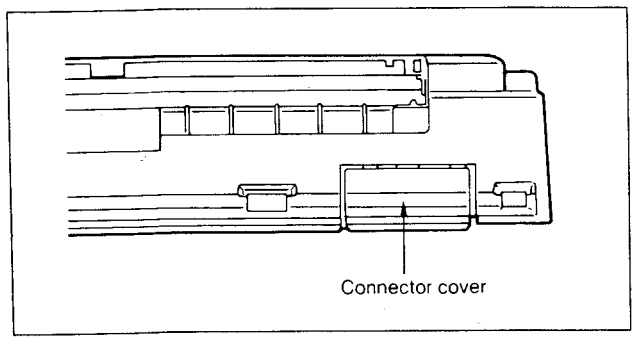

(2) To remove the front panel, release three hooks by pulling down the upper side of the front panel.



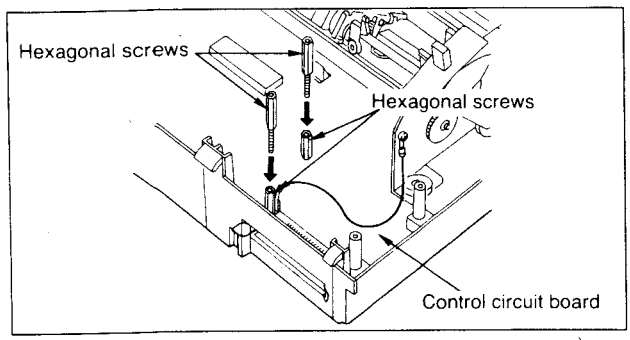

(3) Remove the three screws from the upper cabinet.



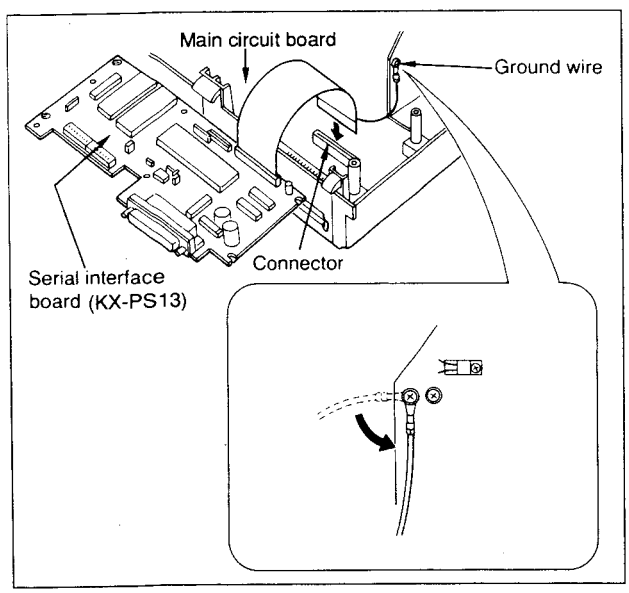

(4) Carefully raise and remove the upper cabinet from the bottom cabinet.



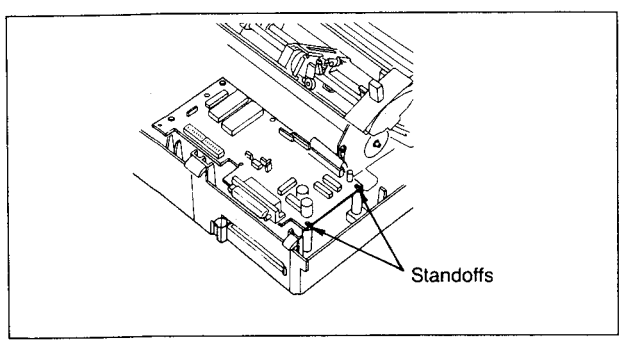

(5) Remove the connector cover from the rear of the upper cabinet.



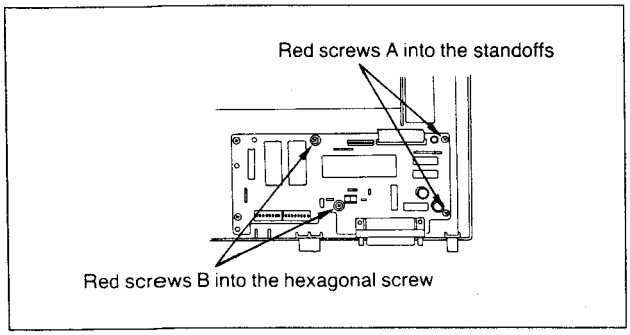

(6) Screw the hexagonal screws to the hexagonal screws on the control circuit board inside the printer.




(7) Connect the cable of the serial interface board (KX-PS13) to the connector on the main circuit board.




(8) Carefully position the serial interface board (KX-PS13) on the two hexagonal screws and the two standoffs as depicted in the diagram below.




(9) Secure the serial interface board (KX-PS13) with two red screws A and two red screws B.

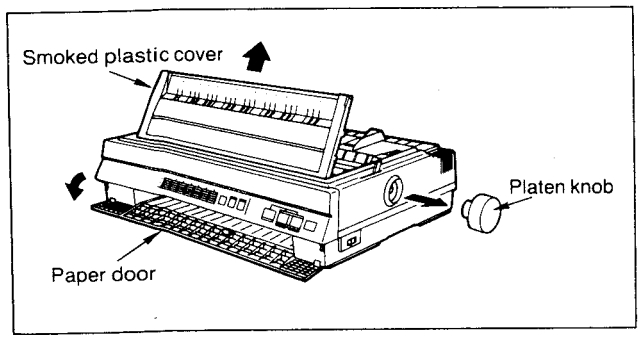
(10) Make sure that DIP switch settings you select match your computer's serial parameters (refer to Section 5).

(11) Replace the upper cabinet, front panel, smoked plastic cover, top cover and the platen knob.

**Note:**
After installation, the following parts will be of no use.
Red screw A ..... 1
Spacer ..... 1

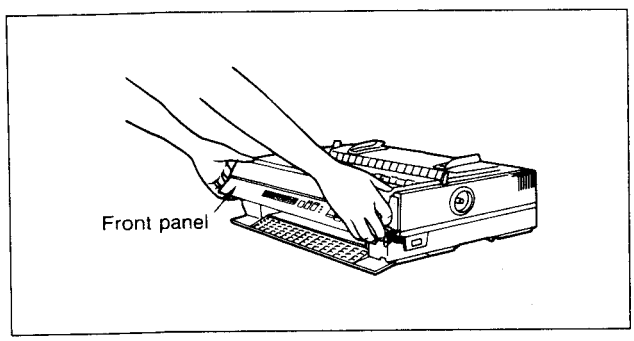
### (C) KX-P1624/KX-P1695/KX-P2624

**Note:** The illustrations you see are drawn from KX-P1624 and apply to the above mentioned printers.

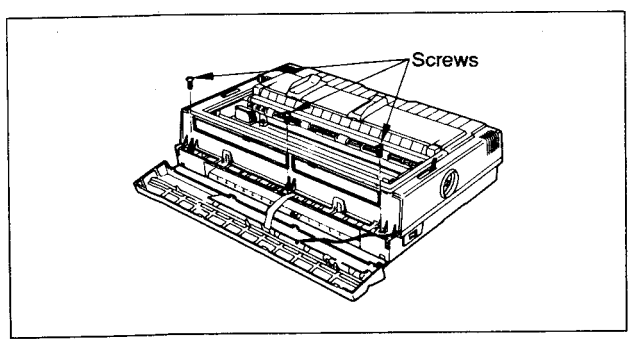



(1) Remove the smoked plastic cover and the platen knob. The platen knob will pull straight out. (For KX-P2624, do not remove the smoked plastic cover.)

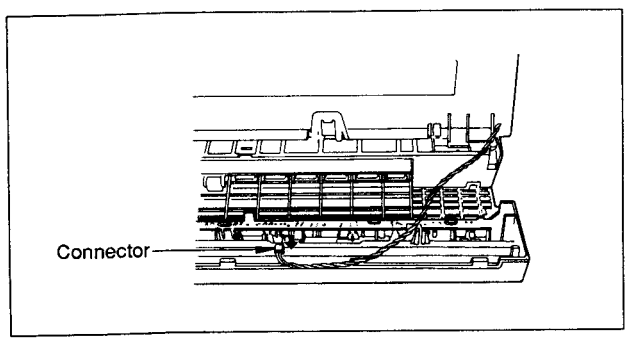
(2) Open the paper door on the front of printer.



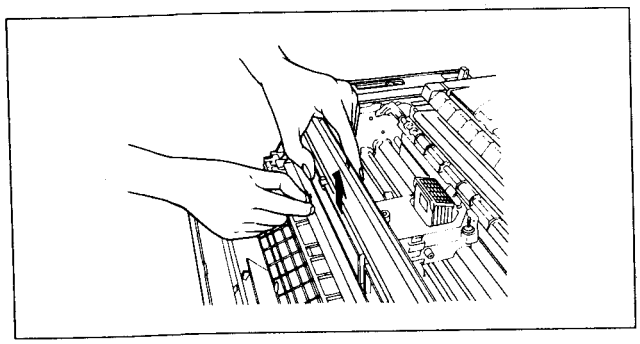

(3) To remove the front panel, grab the front panel and pull the bottom, it will swing out toward you.



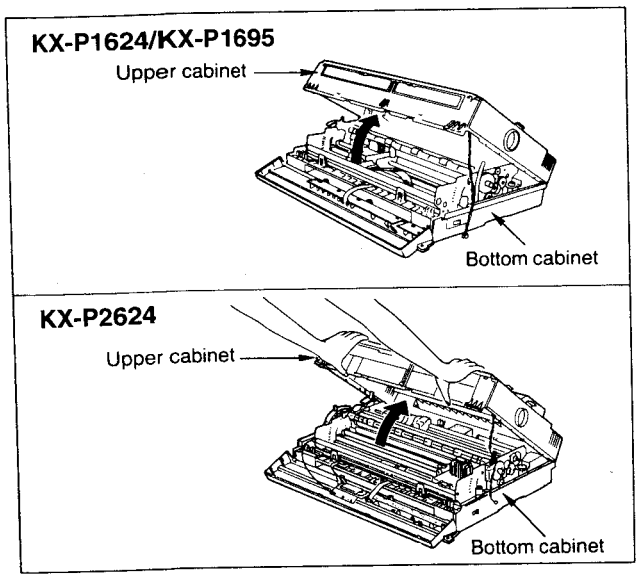

(4) Remove the three screws from the upper cabinet.




(5) Carefully unplug the connector from the front panel.

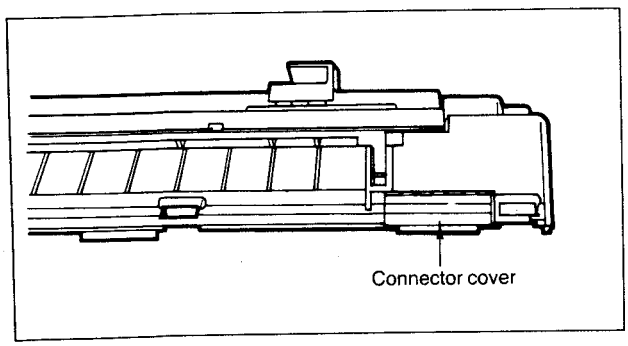


(6) Raise the front of the upper cabinet by releasing the two hooks located in the front.

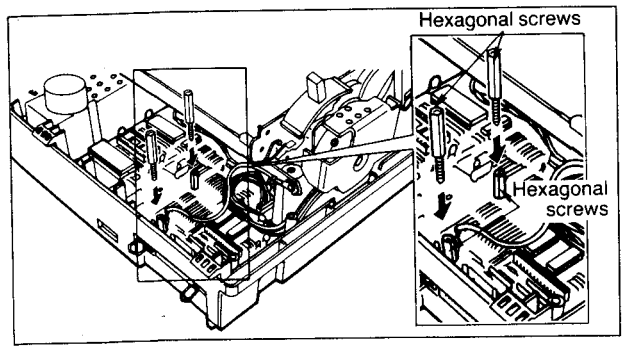



(7) Carefully raise and remove the upper cabinet. Notice how it is latched into the bottom cabinet at the rear of the printer.This will help you when you reinstall the cabinet.

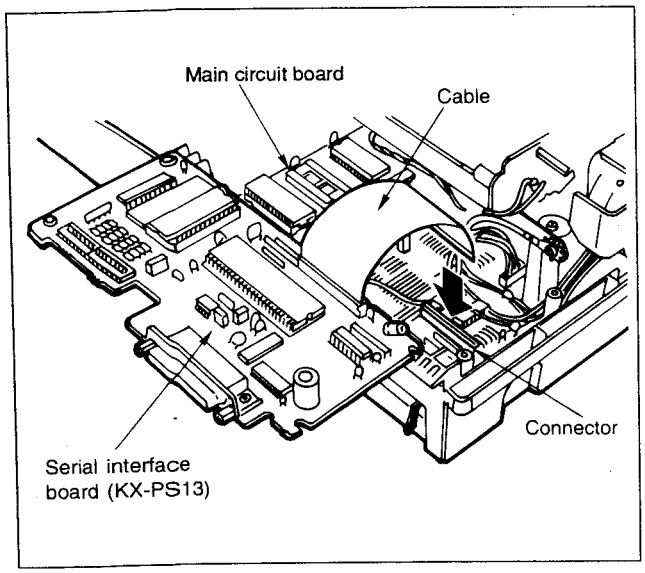
**Note:**
For KX-P2624, raise the upper cabinet while holding the smoked plastic cover so it does not open.



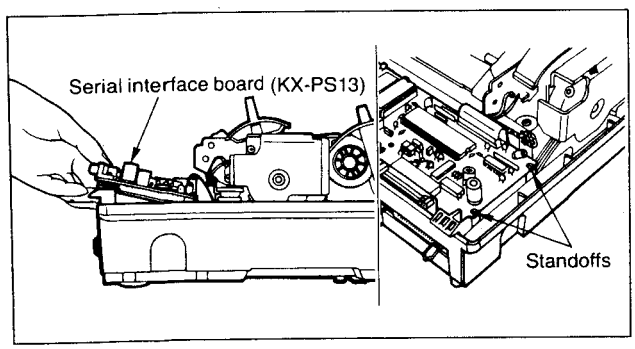

(8) Remove the connector cover from the rear of the upper cabinet.



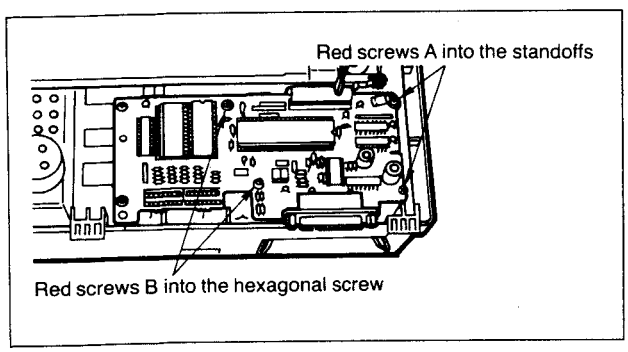

(9) Screw the Hexagonal screws to the hexagonal screws on the control circuit board inside the printer.




(10) Connect the cable of the serial interface board (KX-PS13) to the connector on the main circuit board.




(11) Carefully position the serial interface board (KX-PS13) on the two hexagonal screws and the two standoffs as depicted in the diagram below.




(12) Secure the serial interface board (KX-PS13) with two red screws A and two red screws B.

(13) Make sure that the DIP switch settings you select match your computer's serial parameters (refer to Section 5).

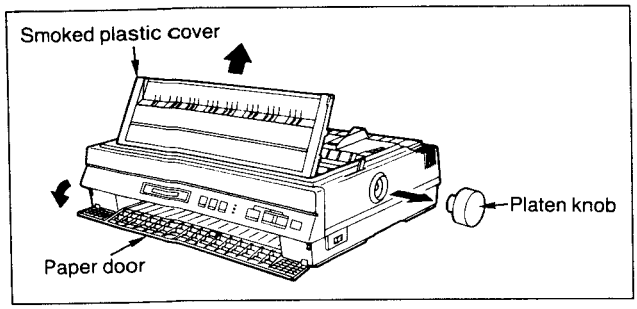
(14) Replace the upper cabinet, front panel, smoked plastic cover and the platen knob.

**Note:**

After installation, the following parts will be of no use.

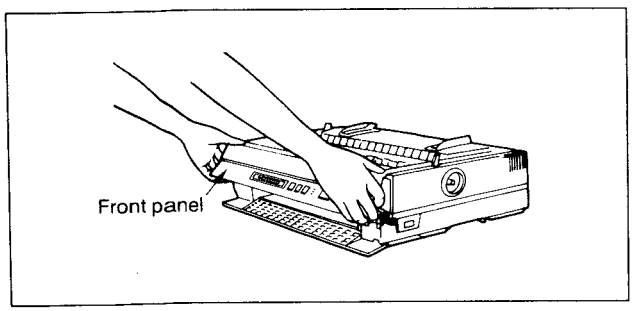
Red screw A ..... 1
Spacer ..... 1

## (D) KX-P1654

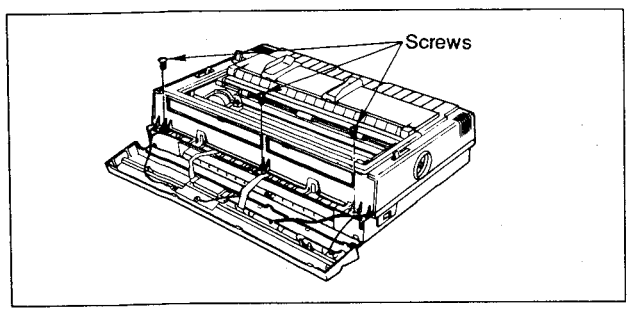



(1) Remove the smoked plastic cover and the platen knob. The platen knob will pull straight out.

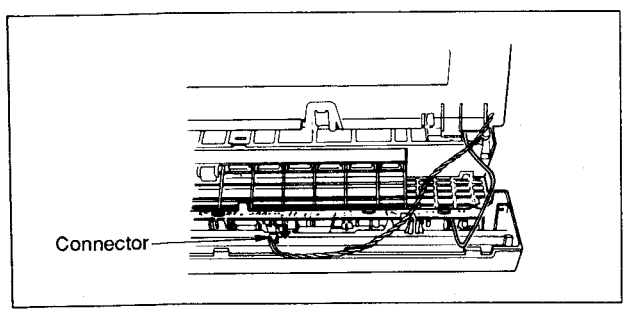
(2) Open the paper door on the front of printer.



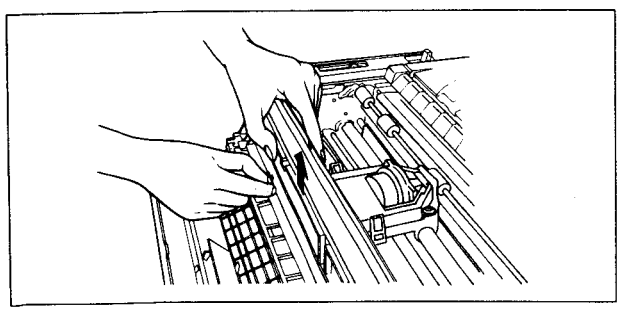

(3) To remove the front panel, grab the front panel and pull the bottom, it will swing out toward you.



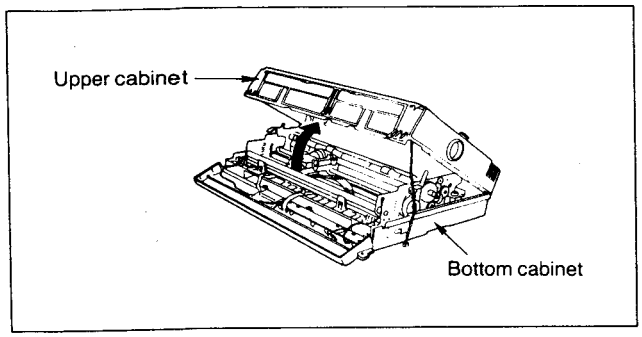

(4) Remove the three screws from the upper cabinet.



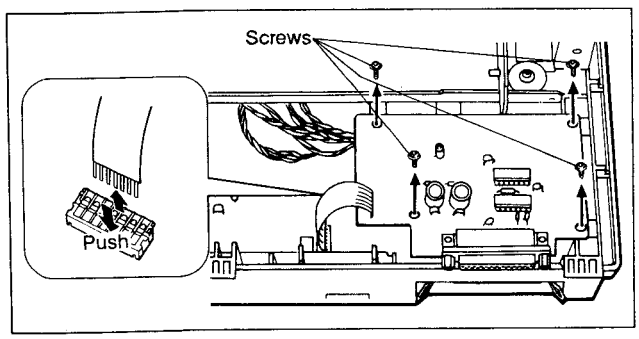

(5) Carefully unplug the connector from the front panel.



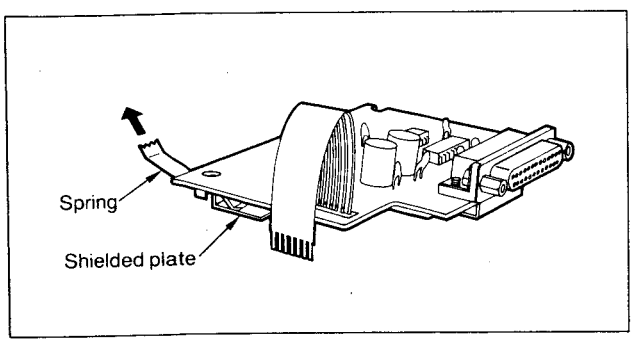
(6) Raise the front of the upper cabinet by releasing the two hooks located in the front.



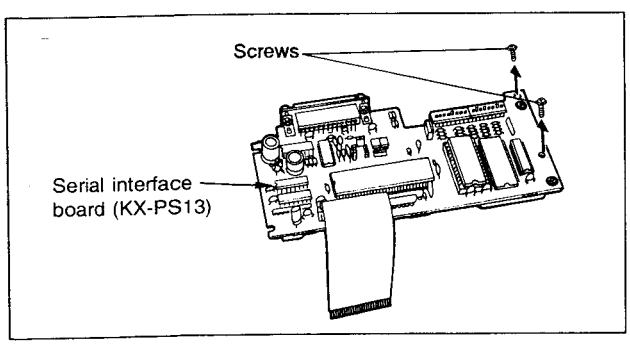

(7) Carefully raise and remove the upper cabinet. Notice how it is latched into the bottom cabinet at the rear of the printer. This will help you when you reinstall the cabinet.



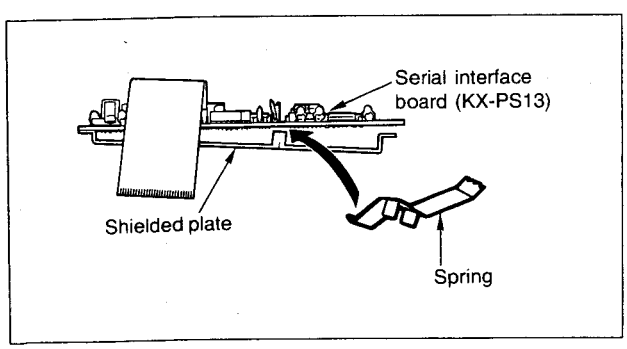

(8) Pull out the cable while pushing the connector. Remove the four screws from the serial interface board and then take out the serial interface board.




(9) Pull out spring inserted between the serial interface board and the shielded plate. Use the spring for the installation of the serial interface board (KX-PS13).

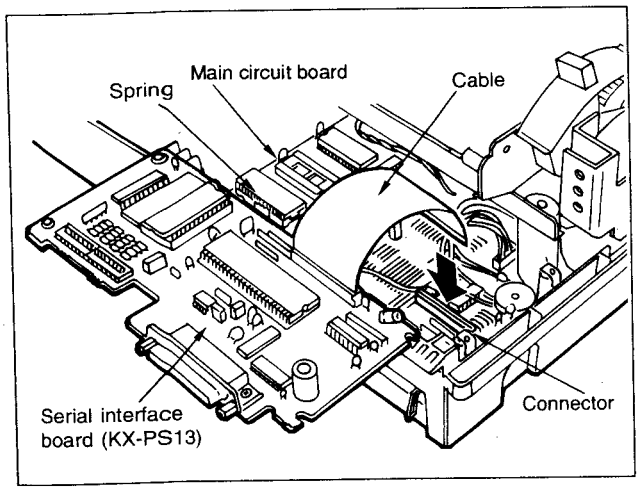



(10) Remove the two screws from the serial interface board (KX-PS13).

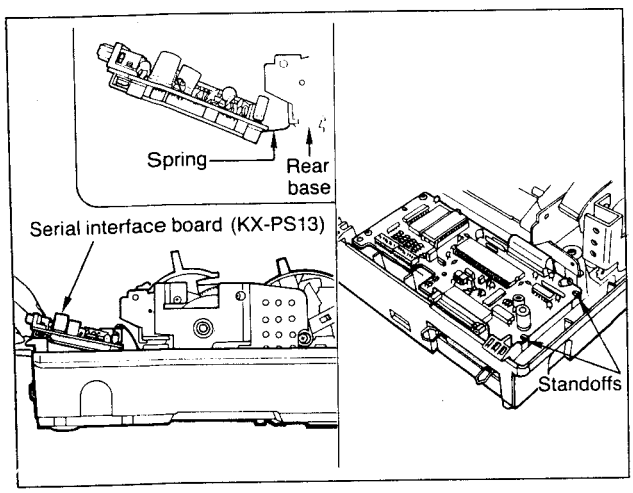



(11) With the shielded plate pulled downwards, insert the spring between the serial interface board (KX-PS13) and the shielded plate as shown. Secure the shielded plate with the two screws after you assure yourself that the spring's hole matched to the serial interface board's hole.

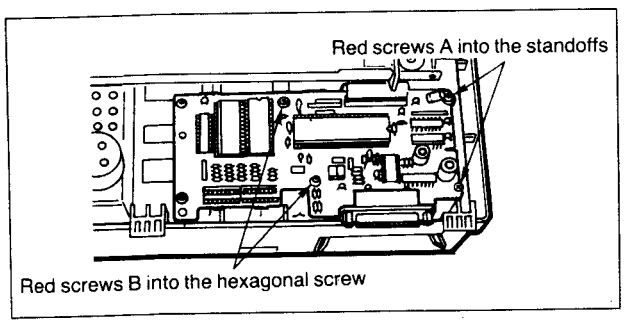
**Note:**
**When inserting the spring, be careful not to damage the printer circuit board.**




(12) Connect the cable of the serial interface board (KX-PS13) to the connector on the main circuit board.




(13) Insert the serial interface board (KX-PS13) so that the end of the spring touches the rear base. Place the serial interface board (KX-PS13) on the two hexagonal screws and the two standoffs.




(14) Secure the serial interface board (KX-PS13) with two red screws A and two red screws B.

(15) Made sure that the DIP switch settings you select match your computer's serial parameters (refer to Section 5).

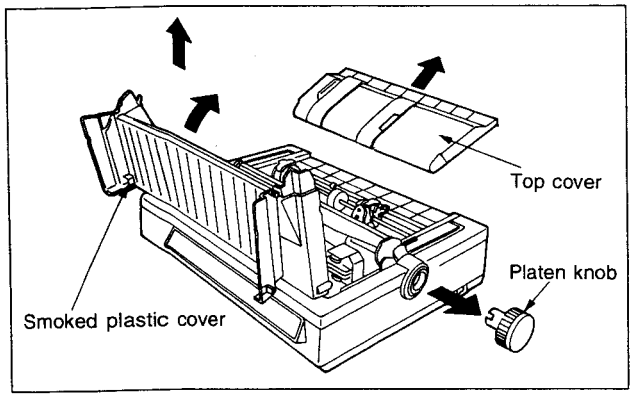
(16) Replace the upper cabinet, front panel, smoked plastic cover and the platen knob.

**Note:**
After installation, the following parts will be of no use.

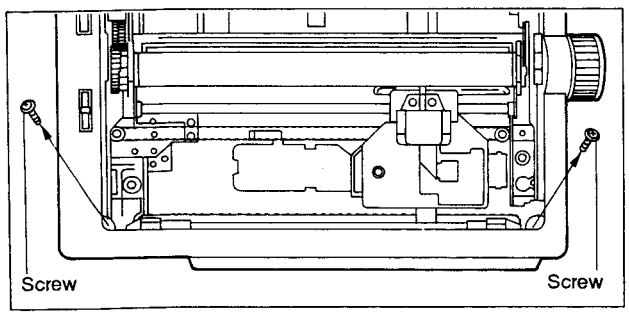
| | |
|---|---|
| Red screw A | 1 |
| Spacer | 1 |
| Hexagonal screws | 2 |

## (E) KX-P2180/KX-P2123/KX-P2124

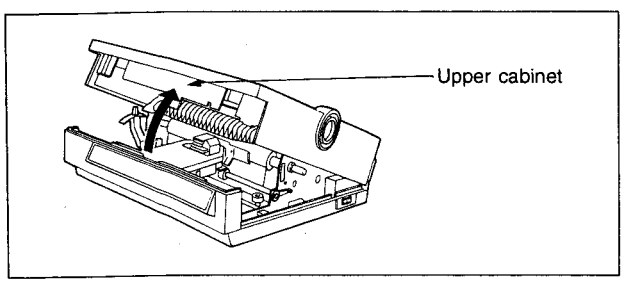
**Note:** The illustrations you see are drawn from KX-P2123.



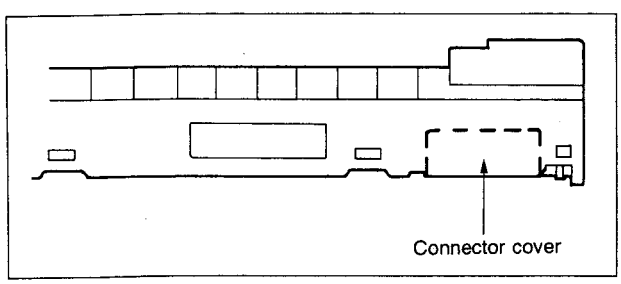

(1) Remove the smoked plastic cover, top cover and the platen knob.



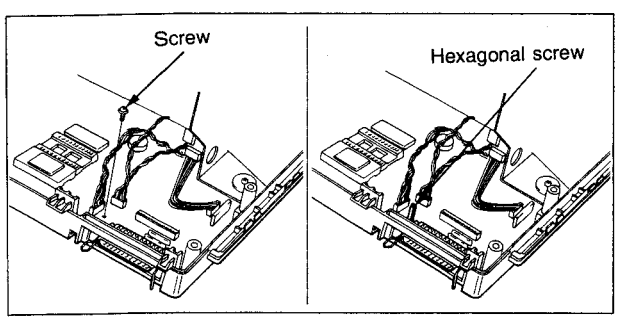

(2) To remove the upper cabinet, remove the two screws from the front side in the printer.



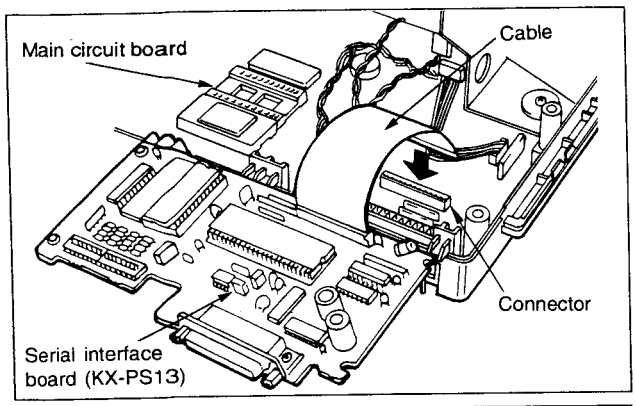

(3) Carefully raise and remove the upper cabinet.



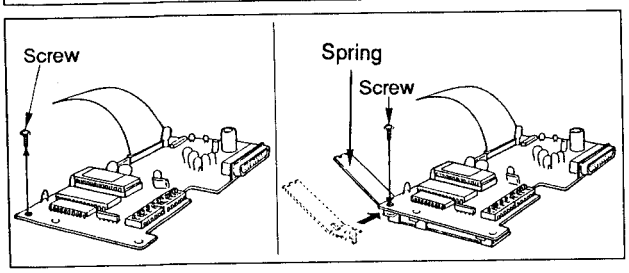

(4) Remove the connector cover from the rear of the upper cabinet, score the edges of the connector cover and snap out.




(5) Remove the screw from the bottom panel and install the hexagonal screw.

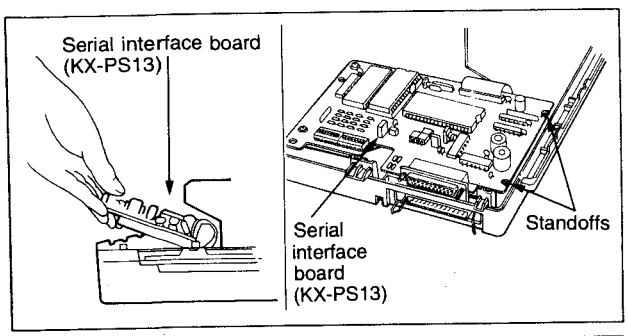



(6) Connect the cable of the serial interface board (KX-PS13) to the connector on the main circuit board.

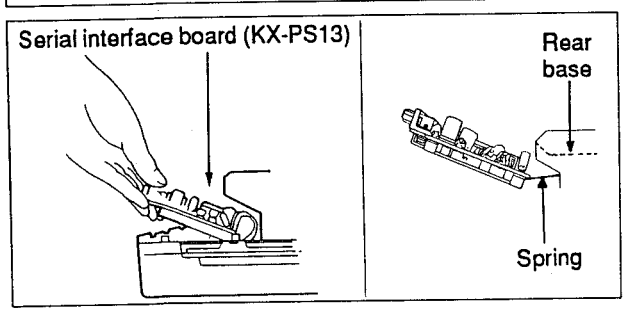



**Note:**
When installing the serial interface board on the KX-P2124 printer, install the spring before inserting the serial interface board.
Remove the screw at the rear of the board. Insert the spring and secure with the screw again as shown.

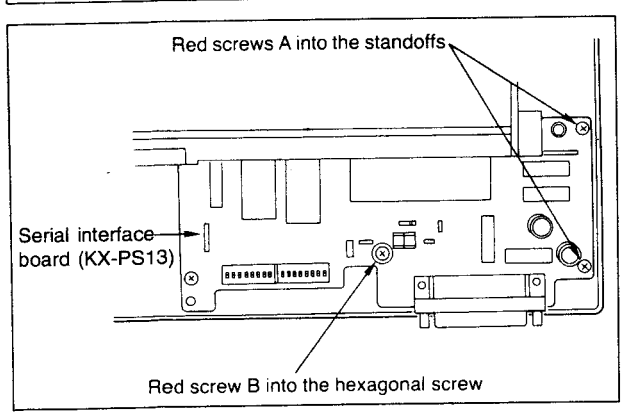
(7) Carefully position the serial interface board (KX-PS13) on the hexagonal screw and the two standoffs as depicted in the diagram below.




**Note:**
When inserting the serial interface board into the KX-P2124 Printer, make sure that the end of the spring touches the rear base.




(8) Secure the serial interface board (KX-PS13) with the two red screws A and red screw B.




(9) Replace the upper cabinet, smoked plastic cover, top cover and the platen knob.

**Note:**
After installation, the following parts will be of no use.

| | |
|---|---|
| Red screws A | 1 |
| Red screw B | 1 |
| Hexagonal screw | 1 |
| Space | 1 |

## 3. Computer Interface

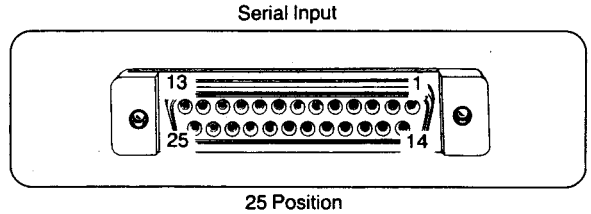
Set the specifications of computer interface to those of the printer before printing. When the computer interface cannot be set, set the printer interface switches to conform to computer specifications.

## 4. Signal Designation

| Pin | Signal name | Flow |
|---|---|---|
| 1 | Frame Ground | |
| 2 | TXD (Transmit Data) | OUT |
| 3 | RXD (Receive Data) | IN |
| 4 | RTS (Request to Send) | OUT |
| 5 | NC | |
| 6 | DSR (Data Set Ready) | IN |
| 7 | SG (Signal Ground) | |
| 8 | DCD (Data Carrier Detector) | IN |
| 9 | NC | |
| 10 | NC | |
| 11 | REV (Reverse Channel) | OUT |
| 12 | NC | |
| 13 | NC | |
| 14 | NC | |
| 15 | NC | |
| 16 | NC | |
| 17 | TTY TXD (+) (Current Loop Transmit Data) | OUT |
| 18 | NC | |
| 19 | NC | |
| 20 | DTR (Data Terminal Ready) | OUT |
| 21 | NC | |
| 22 | NC | |
| 23 | TTY RXD return (−) (Current Loop Receive Data Return) | |
| 24 | TTY TXD return (−) (Current Loop Transmit Data Return) | |
| 25 | TTY RXD (+) (Current Loop Receive Data) | IN |

Note: REV (Pin No. 11) and DTR (Pin No. 20) are connected in the interface.

Connector Pin Configuration



# 5. Interface Function Switches

When setting the printer interface function switches, please set the interface function switches using the following tables.

**Baud Rate**

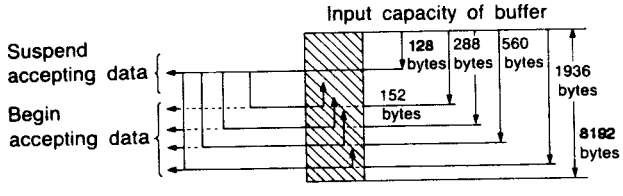
| SWITCH / BAUD RATE | SW1-5 | SW1-6 | SW1-7 | SW1-8 |
|---|---|---|---|---|
| 75 | ON | ON | ON | ON |
| 110 | ON | ON | ON | OFF |
| 134.5 | ON | ON | OFF | ON |
| 150 | ON | ON | OFF | OFF |
| 200 | ON | OFF | ON | ON |
| 300 | ON | OFF | ON | OFF |
| 600 | ON | OFF | OFF | ON |
| 1200 | ON | OFF | OFF | OFF |
| 1800 | OFF | ON | ON | ON |
| 2400 | OFF | ON | ON | OFF |
| 4800 | OFF | ON | OFF | ON |
| 9600 | OFF | ON | OFF | OFF |
| 19200 | OFF | OFF | ON | ON |

**Selection of Parity Check**

| Pin number of the DIP switch | Function | Factory setting |
|---|---|---|
| SW1-2 | ON: With parity check<br>OFF: Without parity check | OFF |
| SW1-3 | ON: Even parity<br>OFF: Odd parity | OFF |

**Buffer Capacity**

| Remaining buffer Capacity | SW2-3 | SW2-4 |
|---|---|---|
| 152 Bytes | OFF | OFF |
| 288 Bytes | OFF | ON |
| 560 Bytes | ON | OFF |
| 1936 Bytes | ON | ON |




1. When the number of bytes remaining in the buffer falls to 128, a DTR or XOFF signal is sent to the computer, pausing data input.
2. As data processing continués, the number of bytes remaining in the buffer increases.
3. When the number of bytes remaining reaches the amount selected (152,288,560,1936),the printer resumes accepting data.

**Word Length**

| Pin number of the DIP switch | Function | Factory setting |
|---|---|---|
| SW1-1 | ON: 7 bit data word length<br>OFF: 8 bit data word length | OFF |

**Self Test**

| SW2-5 | SW2-6 | Mode |
|---|---|---|
| ON | OFF | Loop back |
| ON | ON | Hex. dump |

**Designation of Signal Polarity of DTR (or Reverse Channel)**

This signal is sent to tell the computer that the printer temporarily can not accept data while it is on-line. Select DTR control (ON) by DIP switch SW2-7 and then adjust the signal polarity of DTR to match that of the computer by setting DIP switch SW1-4. If DTR control is disabled (OFF) DTR signal is controlled "mark" or "space" to accept transferring data depend on DIP switch SW1-4 setting.

ON: When the signal is "space", the printer tells the computer that it can not accept transferring data.
OFF: When the signal is "mark", the printer tells the computer that it can not accept transferring data.
SW1-4 is set to "OFF" at shipment.
Mark: logic "1" (-13 V)
Space: logic "0" (+12 V)

## DIP Switch Functions and Settings

**DIP switch 1 settings (SW1)**

| | Function | ON | OFF | Factory setting |
|---|---|---|---|---|
| SW1-1 | Data length | 7 bit | 8 bit | OFF |
| SW1-2 | Parity check | Valid | Invalid | OFF |
| SW1-3 | Parity bit | Even | Odd | OFF |
| SW1-4 | DTR polarity | Reversed | Normal | OFF |
| SW1-5 | | Refer to the Baud Rate Setting Table | | ON |
| SW1-6 | | | | OFF |
| SW1-7 | | | | OFF |
| SW1-8 | | | | OFF |

**DIP switch 2 settings (SW2)**

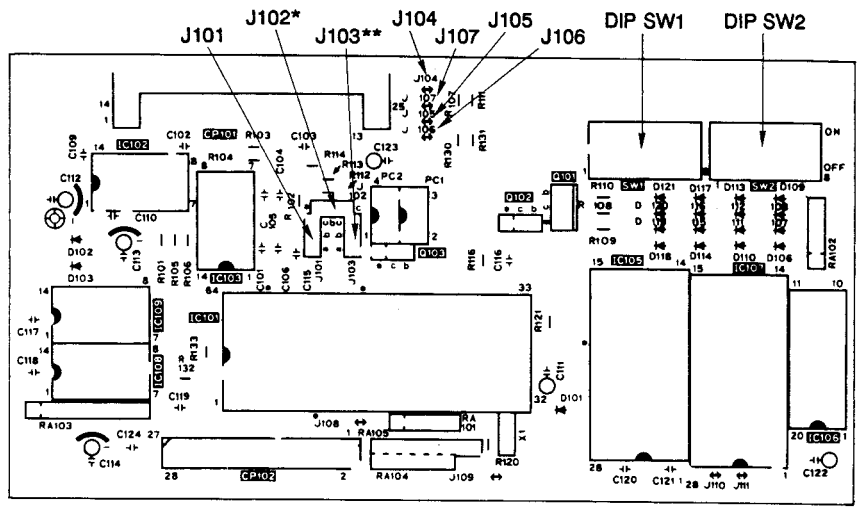
| | Function | ON | OFF | Factory setting |
|---|---|---|---|---|
| SW2-1 | Not used | —— | —— | OFF |
| SW2-2 | Buffering enable | enable | disable | ON |
| SW2-3 | Buffer full recovery | Refer to the Remaining Buffer Capacity Table | | ON |
| SW2-4 | Buffer full recovery | | | OFF |
| SW2-5 | Self test enable | enable | disable | OFF |
| SW2-6 | Self test mode select | hex. dump | loop back | OFF |
| SW2-7 | DTR control | enable | disable | OFF |
| SW2-8 | Protocol | ETX/ACK | X/ON-X/OFF | OFF |

# 6. Jumper Setting

| | When using RS-232C | | When using Current loop | | Factory |
|---|---|---|---|---|---|
| | DTR Control | X/ON-X/OFF or ETX/ACK | DTR Control | X/ON-X/OFF or ETX/ACK | setting |
| J101 a-b | ON | ON | OFF | OFF | ON |
| b-c | OFF | OFF | ON | ON | OFF |
| J103 a-b | N/A | N/A | OFF | ON | OFF |
| b-c | N/A | N/A | ON | OFF | OFF |
| J104 | OFF | OFF | OFF (ON) | OFF (ON) | OFF |
| J105 | OFF | OFF | OFF (ON) | OFF (ON) | OFF |
| J106 | OFF | OFF | OFF (ON) | OFF (ON) | OFF |
| J107 | OFF | OFF | OFF (ON) | OFF (ON) | OFF |

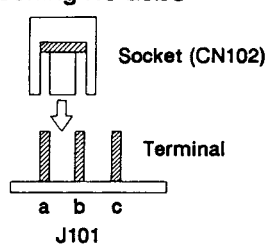
(ON) : When the computer has no current source, please connect.
N/A : Irrelevant

Jumper locations are shown below.

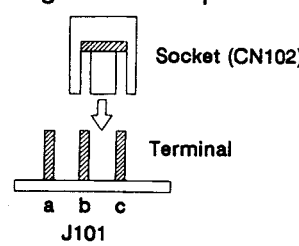



* J102 connection is fixed at b-c as factory setting.
** Use the socket (CN103) provided on J102 for connection of J103, otherwise the socket should stay at factory setting on J102.

Setting RS-232C




Setting Current Loop




**Note:** When setting protocol set the DIP switches as follows.

| | X/ON-X/OFF | ETX/ACK | DTR |
|---|---|---|---|
| SW2-7 | OFF | OFF | ON |
| SW2-8 | OFF | ON | N/A |

N/A : Irrelevant

**Note:** 1. When the computer has no current source, connect J104, 105, 106 and J107 to supply signal current.
2. When setting protocol set the DIP switches and Jumper as follows.

| | X/ON-X/OFF | ETX/ACK | DTR |
|---|---|---|---|
| SW2-7 | OFF | OFF | ON |
| SW2-8 | OFF | ON | N/A |
| J103 * | connect a-b | connect a-b | connect b-c |

* Use the socket provided on J102 for connection of J103.

# 7. Explanation of Electrical Operation

±12V Rectifier Circuit
The current Loop Level (20mA) signals from the host computer are converted to TTL level signals by PC2 and Q103.

Clock Circuit
A 7.37 MHz clock signal is produced by X1.

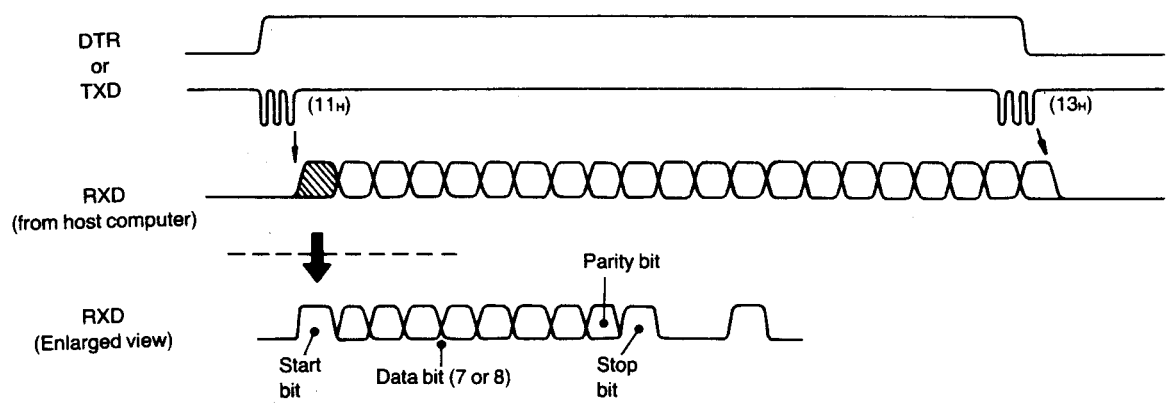
DIP Switch Input Circuit
A communication mode set by DIP switches SW1 and SW2 is input to the CPU on the serial board when the power switch is operated.

Line Driver
The IC102(75188) inverts the TTL level signals from the CPU on the serial board and converts them to the EIA RS-232C (+12V, —13V ) levels.

The TTL level signals from the CPU on the serial board are converted to the Current Loop level (20 mA) signals by the Q102, PC1 and Q101.

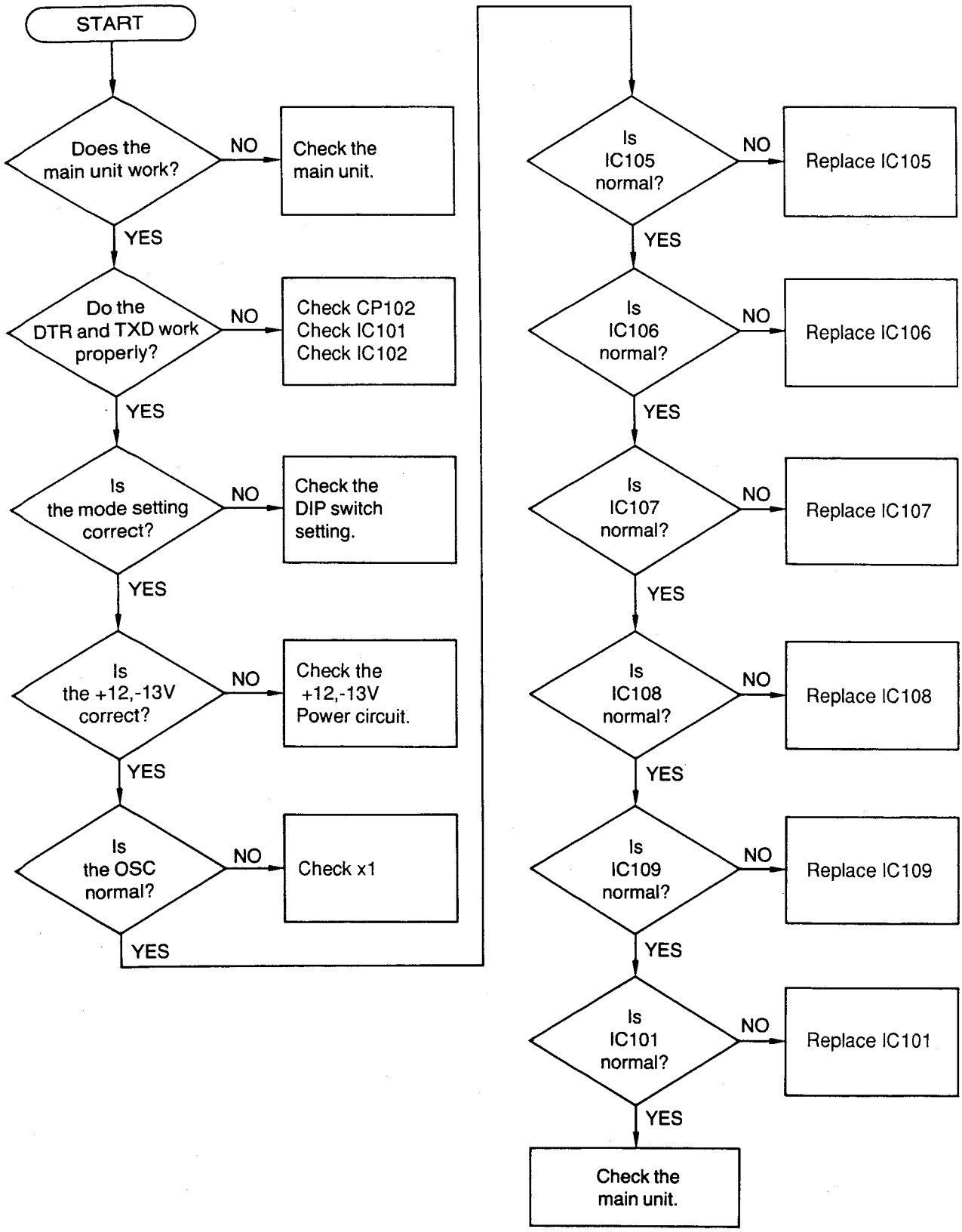
Line Receiver
The IC103 (75189) inverts the RS-232C level signals (±3 ~ ±30 V) from the host computer output and converts them to the TTL level signals.
The current Loop level (20 mA) signals from the host computer are converted to TTL level signals by PC2 and Q103.

**Timing Chart**

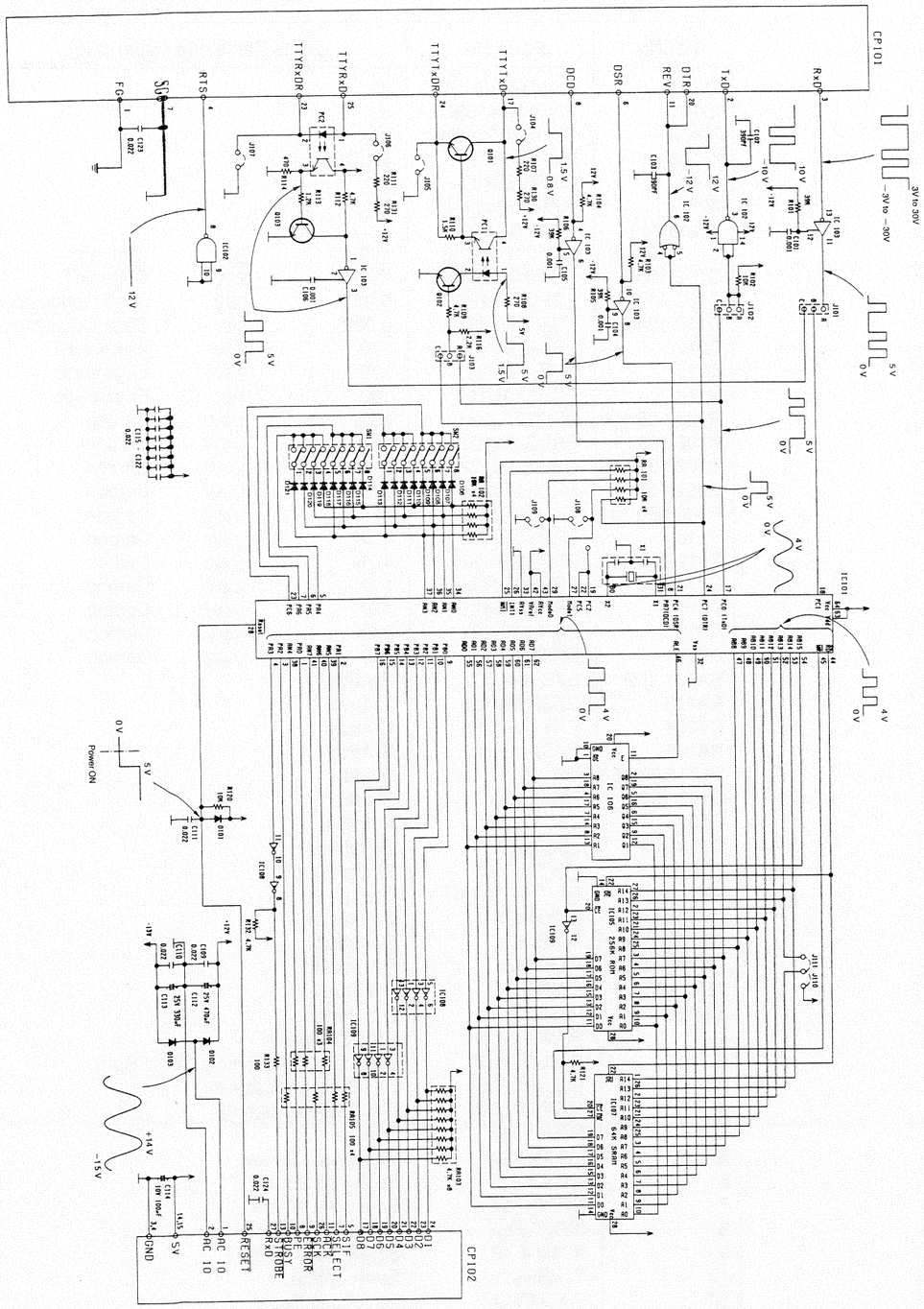


# 8. Trouble Shooting Flow Chart

**Note:** Before tracing the problem, make sure the Printer is in good operating condition.

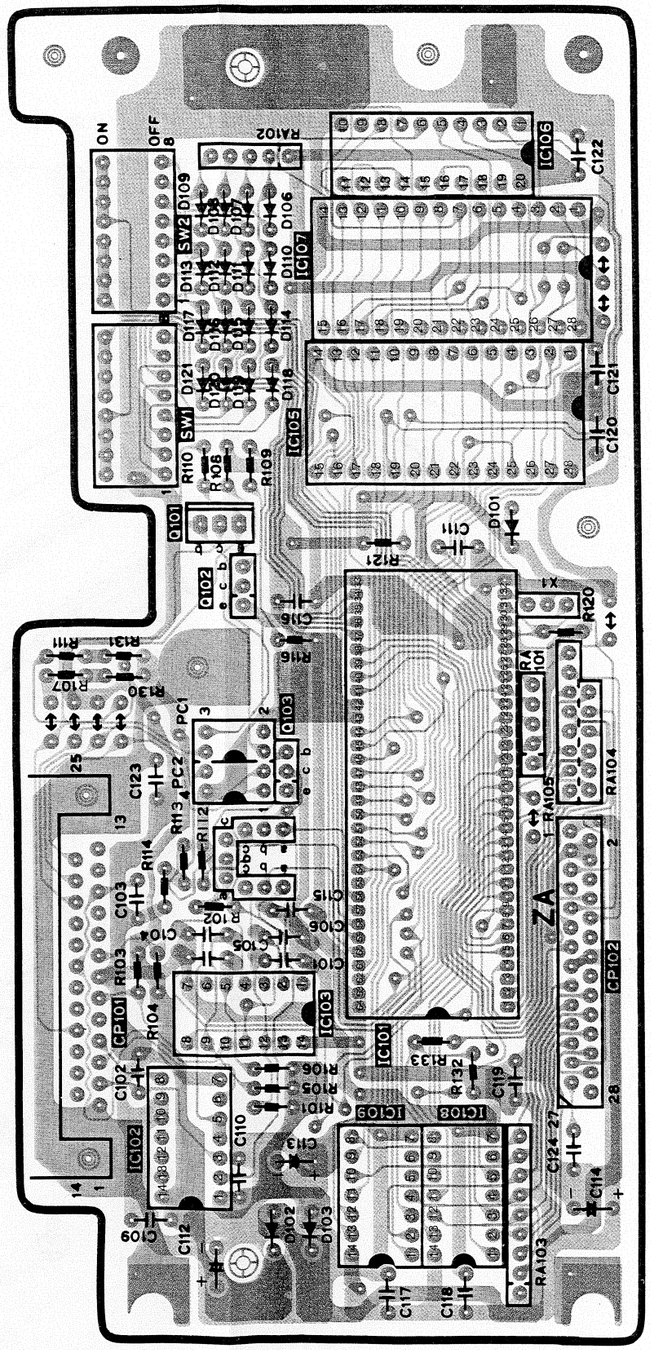


## 9. Schematic Diagram



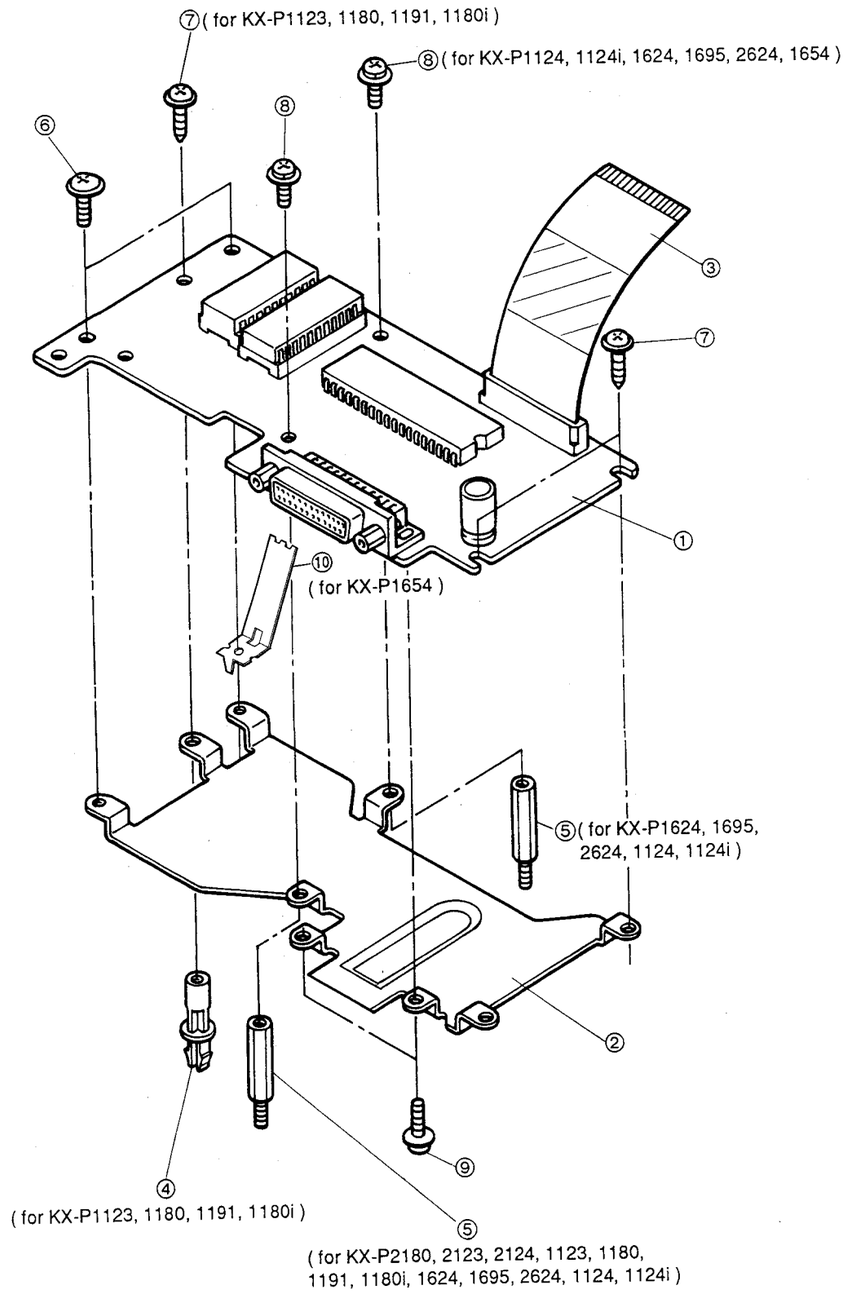


## 10. Circuit Board Diagram



(Parts Side View)

## 11. Replacement Parts List






Note: The S mark is for service standard parts and may differ from production parts.

| Ref.No. | Parts No. | Parts Name and Description | | | Per Set | Remarks |
|---|---|---|---|---|---|---|
| IC101 | PJVID7810HCW | IC | | | 1 | |
| IC102 | PJVISN75188N | IC | | | 1 | |
| IC103 | PJVISN75189N | IC | | | 1 | |
| IC105 | PJWIP19M1 | IC (ROM) | | | 1 | |
| IC106 | DN74LS373 | IC | | | 1 | |
| IC107 | PJVIMB8464A | IC | | | 1 | |
| IC108,109 | PJVIT74LS05P | IC | | | 2 | |
| C101,104-106 | ECKD1H102KB | 1000P | 50V | Ceramic | 4 | S |
| C102,103 | ECKD1H391KB | 390P | 50V | Ceramic | 2 | S |
| C109-111 | ECFD1H223ZF | 0.022 | 50V | Semi-Conductor | 3 | S |
| C115-124 | ECFD1H223ZF | 0.022 | 50V | Semi-Conductor | 10 | S |
| C112 | ECEA1EU471 | 470 | 25V | Electrolytic | 1 | |
| C113 | ECEA1EU331 | 330 | 25V | Electrolytic | 1 | |
| C114 | ECEA1AU101 | 100 | 10V | Electrolytic | 1 | |
| R101,105,106 | ERDS2FJ393 | 39K | 1/4W | Carbon | 3 | S |
| R102,120 | ERDS2FJ103 | 10K | 1/4W | Carbon | 2 | S |
| R103,104,109 | ERDS2FJ472 | 4.7K | 1/4W | Carbon | 3 | S |
| R107,111 | ERDS2FJ221 | 220 | 1/4W | Carbon | 2 | S |
| R108,130,131 | ERDS2FJ271 | 270 | 1/4W | Carbon | 3 | S |
| R110 | ERDS2FJ152 | 1.5K | 1/4W | Carbon | 1 | S |
| R112,121,132 | ERDS2FJ472 | 4.7K | 1/4W | Carbon | 3 | S |
| R113 | ERDS2FJ122 | 1.2K | 1/4W | Carbon | 1 | S |
| R114 | ERDS2FJ471 | 470 | 1/4W | Carbon | 1 | S |
| R116 | ERDS2FJ222 | 2.2K | 1/4W | Carbon | 1 | S |
| R133 | ERDS2FJ101 | 100 | 1/4W | Carbon | 1 | S |
| RA101,102 | EXBP84103J | R-Array | | | 2 | |
| RA103 | EXBP88472J | R-Array | | | 1 | |
| RA104 | EXBT43101J | R-Array | | | 1 | |
| RA105 | EXBT44101J | R-Array | | | 1 | |
| D101,106-121 | MA165 | Diode | | | 17 | |
| D102,103 | PJVDD1NL | Diode | | | 2 | |
| Q101 | 2SD1258Q | Amplifier | | | 1 | |
| Q102,103 | 2SD636Q | Switching | | | 2 | |
| PC1,2 | PJVITLP521 | Photo Coupler | | | 2 | |
| X1 | PJVCST7.37MT | Crystal | | | 1 | |
| CP101 | PJJS119Y | Connector | | | 1 | |
| CP102 | PJJS460Z | Connector | | | 1 | |
| CN102,103 | PJJS35Z | Pin Socket | | | 2 | |
| J101-103 | PJJP30Z | Pin Plug | | | 3 | |
| SW1,2 | PJSSX014Z | Dip Switch | | | 2 | |
| 1 | PJWPPS13M | PCB Complete | | | 1 | |
| 2 | PJZUPS13M | Shield Plate Assembly ( for U.S.A ) | | | 1 | |
| | PJZUPS13C | Shield Plate Assembly | | | 1 | |
| 3 | PJWWP19M | Flat Cable Assembly | | | 1 | |
| 4 | PJME106Y | Spacer | | | 1 | |
| 5 | PJHD3420Z | Hexagonal Screw | | | 1 | |
| 6 | XTW3+6L | Screw 3 x 6 mm | | | 2 | |
| 7 | XTW3+12SR | Screw 3 x 12 mm | | | 2 | |
| 8 | XYN3+F8R | Screw 3 x 8 mm | | | 2 | |
| 9 | XYN3+F10 | Screw 3 x 10 mm | | | 2 | |
| 10 | PJUS94Y | Earth Spring | | | 1 | |
| P1 | PJQX6514Z | Instruction Book | | | 1 | |
| P2 | PJPK494Z | Carton Box | | | 1 | |
| P3 | PJPF16Z | Soft Sheet | | | 1 | |